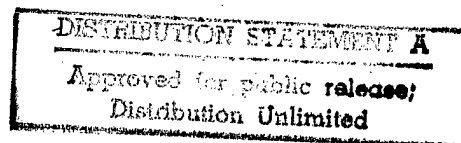


DEPARTMENT OF DEFENSE
INFORMATION AND GUIDANCE
ON
THE PRESIDENT'S
STRATEGIC DEFENSE INITIATIVE



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OVERVIEW OF STRATEGIC DEFENSE INITIATIVE

For the past three years, the Reagan Administration has sought to restore the balance of forces necessary to maintain peace and stability by modernizing the strategic deterrent while at the same time pressing for significant, verifiable arms reductions. This year, President Reagan has included in the defense budget a research program that explores the possibility of strengthening deterrence further by taking advantage of recent advances in technology that could, in the long term, provide an effective defense against ballistic missiles. The new program focuses on existing research and development programs, totaling nearly \$1.8 billion (88% DoD, 12% DOE) in FY 1985, in five technology areas that offer the greatest promise for defense against ballistic missiles. It also includes an additional funding increment of about \$0.250 billion to augment these and exploit other new technological opportunities.

In consolidating these efforts, the Strategic Defense Initiative seeks to develop sound technical options that could allow future Presidents to decide whether to develop an effective defense against ballistic missiles. While such a research effort would not affect current arms control treaties, President Reagan also directed a full and continuing assessment of the future implications of developing strategic defenses for our defense posture, deterrence strategy, and arms reduction program.

The Strategic Defense Initiative is designed to work toward the long-term national goal, set by President Reagan in a speech to the American people last March, of putting an end to the threat of ballistic missiles. To determine the technical feasibility and strategic implications of pursuing that goal, the Defense Department formed two study groups of

scientists and national security experts. The reports of those studies, submitted in October 1983, form the basis for the proposed strategic defense program. The Defensive Technologies Study, headed by Dr. James Fletcher, the former Director of NASA, concluded that promising new technologies are becoming available that justify a long-term research effort to identify future technical options concerning the development of a defense against ballistic missiles. Exploring the implications of strategic defense, two Future Security Strategy studies, one interagency and one contractor, concluded that defensive systems could strengthen stability and deterrence and enhance prospects for arms reduction.

The studies recognized that there are uncertainties that will not be resolved until more is known about the technical characteristics and capabilities of defensive systems and the response of the Soviet Union to U.S. initiatives. These uncertainties notwithstanding, the studies concluded that it was essential that options for the deployment of advanced ballistic missile defenses be established and maintained. Our national security requirements permit us no alternative because the decision to begin ballistic missile defense deployment is not solely a U.S. decision. For a number of years the Soviet Union has pursued advanced ballistic missile defense technologies, and it is the only country maintaining an operational system of terminal ballistic missile defense. Unilateral Soviet deployment of an advanced system capable of effectively countering Western ballistic missiles -- added to the already impressive Soviet air and passive defense capabilities -- would jeopardize deterrence because the United States would no longer be able to pose a credible threat of retaliation.

In the 1980s, technology has progressed to the point where a focused research program for developing effective defensive systems is a feasible proposition. For example, one of the

fundamental ingredients in a strategic defense system is the ability to make millions of logical decisions per second. Recent advancements in data processing capability make possible for the first time the real-time surveillance, acquisition and tracking of large numbers of strategic missiles and warheads. Miniaturized data processing capabilities also provide for basing options that were inconceivable a decade ago. Recent progress in directed-energy technologies, more sophisticated sensors and enhanced survivability, when added to our computing capability, now allow us to think about a research program with real potential for answering the technical questions that are crucial to an effective strategic defense capability.

In spite of these encouraging developments we want to emphasize that the Strategic Defense Initiative is not a weapons system development and deployment program, but rather a broad-based, centrally managed research effort to identify and develop the key technologies necessary for an effective strategic defense. The research will be initially focused on: technologies for sensing and tracking missiles; technologies for weapons to be used against missiles and warheads; technological support for control of such a system; and technologies to insure the survivability of the system. The specific research efforts will be organized in five areas:

- Surveillance, acquisition, tracking, and kill assessment
- Directed energy technologies
- Kinetic energy technologies
- Systems concepts, battle management, and command, control and communication

- Survivability, weapons lethality, and support systems.

It is highly unlikely that our research efforts would lead to a single system that could intercept and defend flawlessly against all missiles and all attacks. There is probably no such "magic bullet." What we anticipate is a defense network, a series of systems not necessarily based on the same technology or physical principles, which taken together will provide an effective defense against ballistic missiles. Such a set of systems will almost surely be layered -- that is, designed to cover the full trajectory of a ballistic missile. This layered system offers the potential for a highly effective defense of the United States and allied countries. Obviously our research effort must overcome numerous complex technical challenges. By our beginning a broad-based research effort now, future Presidents and future Congresses will have the option of deciding whether to proceed with the actual development of the most promising strategic defense systems.

In proposing that we begin a research effort to develop defensive technologies, the President is hoping to develop a means of maintaining peace, in addition to offensive strategic forces and arms reduction, that could provide a stable and secure environment for our nation and our allies in the next century. Strategic defense, when combined with stabilizing offensive force modernization and mutual overall nuclear arms reductions, holds the promise of substantially lowering the utility of ballistic missiles. This initiative will provide future Presidents important tools and options with which to stabilize future crises.

While moving to explore strategic defenses, the President remains fully committed to force modernization and arms reduction. To maintain an effective deterrent now and in the

years ahead, we are continuing the effort to modernize our strategic and intermediate-range nuclear assets and conventional forces. To move toward genuine and significant arms control, the President is pursuing a series of ambitious arms reduction proposals. In fact, arms reductions and defensive force options can be mutually reinforcing. Effective, advanced defenses that reduce the utility of offensive nuclear arms have the potential for increasing the likelihood of negotiated reductions of those offensive forces. In turn, effective limitations on offensive systems can be important in assisting defensive systems to reach their full potential.

While remaining consistent with our dual policies of deterrence and arms reductions, the Strategic Defense Initiative must also complement other elements of our national security capabilities and policies. Considerations of defenses against a range of nuclear threats does not diminish the need to strengthen U.S. and allied conventional military capabilities to maintain our commitments around the world.

An effective defense against ballistic missiles can have far-reaching implications of enhanced deterrence, greater stability, and improved opportunities for arms control. Our efforts do not seek to replace our proven policies for maintaining peace, but to strengthen their effectiveness in the face of a growing Soviet threat. The essential objective of the U.S. Strategic Defense Initiative is to diminish the risk of nuclear destruction and to provide for a safer, less menacing way of preventing nuclear war in the decades to come.

DEFENSE AGAINST BALLISTIC MISSILES

An Assessment of Technologies and Policy Implications



Department of Defense

6 MARCH 1984



THE SECRETARY OF DEFENSE

WASHINGTON, THE DISTRICT OF COLUMBIA

Since the dawn of the nuclear age, the United States has sought to preserve peace through deterrence. By making the cost of aggression far greater than any potential gain, the United States has successfully deterred conflict between the major powers for almost four decades.

In the face of an expanding Soviet nuclear arsenal, this Administration has taken steps to strengthen the offensive arm of deterrence while also working for significant, verifiable arms reductions. But President Reagan has also offered the hope of a world made even safer from the threat of nuclear conflict if we could develop defensive systems.

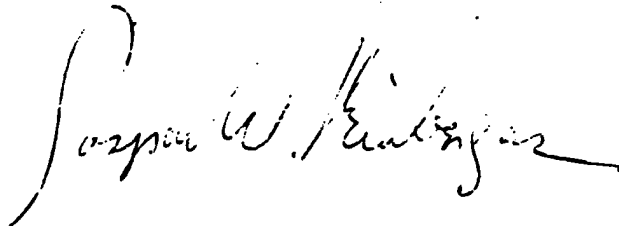
America has always drawn on its technological genius to strengthen its deterrent--both strategic and conventional. And now recent advances in technology offer us, for the first time in history, the opportunity to develop an effective defense against ballistic missiles and the possibility of fulfilling President Reagan's vision of a safer world. Achieving that worthwhile goal will not be easy. For that reason, the analysis provided by the Defensive Technologies Team and the Future Security Team is indispensable.

To carry on the work that those study teams began, the Department of Defense has combined into a single Strategic Defense Initiative previously planned research and development programs in five technology areas. Those areas that offer the greatest promise for an effective defense against ballistic missiles are: surveillance, acquisition and tracking; directed energy weapons; kinetic energy weapons; systems analysis and battle management; and support programs, such as space electrical power and heavy lift launch vehicles. To the \$1.74 billion already planned for research in those five technological areas, the Defense Department has requested an additional \$250 million to begin testing weapons lethality, to research spacecraft survivability, and to exploit other new technological opportunities.

Successful completion of our research programs to determine the most effective defense against ballistic missiles will require the cooperation of many different organizations and all the Military Services. To coordinate all those efforts, the President has directed that we establish a centralized management office within the Department of Defense. The Program Manager will report directly to the Secretary of Defense and will hold frequent reviews to assess progress and make decisions concerning future direction of the Strategic Defense Initiative.

We firmly believe that our research can point out ways to achieve a reliable and effective ballistic missile defense that will enhance deterrence for the United States and our allies. But to succeed in that vital endeavor, we must have the full support of Congress and the American people and wholehearted participation by America's scientists and strategists.

While much remains to be done, we have made a good beginning with these two fine studies. It is vitally important that we continue our efforts to put an end to the threat of nuclear weapons. There can be no winners in a nuclear war. That terrible truth provides the incentive; science provides the opportunity. For the benefit of all mankind, we are committed to seizing that opportunity without delay.

A handwritten signature in dark ink, reading "Ronald W. Reagan". The signature is written in a cursive style with a long, sweeping underline that extends to the right.

In March 1983 President Reagan offered a hopeful vision of the future based on a program to "counter the awesome Soviet missile threat with measures that are defensive." He said, "we must thoroughly examine every opportunity for reducing tensions and for introducing stability into the strategic calculus of both sides." He spoke of the massive and continuing Soviet buildup of nuclear and nonnuclear forces and of the bleakness of the future before us if we rely solely on the threat of retaliation to deter Soviet attacks against the United States or our allies. The President proposed a strategy that would "significantly reduce any incentive that the Soviet Union may have to threaten attack." He asked, "what if free people could live secure in the knowledge that...we could intercept and destroy strategic ballistic missiles before they reached our own soil or that of our allies?"

The President ordered an assessment of technologies and systems that might provide a defense against ballistic missiles, together with a study of the policy implications of ballistic missile defenses for the United States and our allies. From June through October 1983, these two studies were conducted in close coordination,* and this report is based on them.

* The study of technologies and systems for ballistic missile defense was conducted by a team of scientists under the direction of Dr. James C. Fletcher. The implications for defense policy, strategy, and arms control were addressed by two study teams: an interagency team of experts led by Mr. Franklin C. Miller, and a team of outside experts led by Mr. Fred S. Hoffman.

POLICY IMPLICATIONS OF DEFENSES AGAINST BALLISTIC MISSILES

During the 1950s, the United States maintained substantial programs for defense against possible attack by Soviet bombers. But in the 1960s, in light of the growing threat from Soviet missiles, the United States Government concluded that an effective missile defense would be most difficult to achieve. Moreover, it was thought that deployment would not be desirable because it might provide an incentive for the Soviets to further increase their offensive strategic forces to overwhelm our missile defenses, and that they could do so at a cost much lower than our cost for missile defenses. And once our increasing vulnerability to Soviet missiles attack was accepted, it did not seem warranted to continue a major effort for defense against Soviet bombers. As a result, we largely disbanded our air defenses in the 1960s.

At the same time, a strategic theory gained currency in the United States that held that deterrence of nuclear attack could best be maintained if both the United States and the Soviet Union were vulnerable to attack. This theory found expression in the Anti-Ballistic Missile (ABM) Treaty, which was designed to foreclose widespread deployment of ballistic missile defenses, and in the anticipation that we could reach agreements first to limit and then to reduce strategic offensive forces.

Unfortunately, neither the U.S. abandonment of the attempt to defend against nuclear attack in the 1960s nor the ABM Treaty and the SALT I and II agreements have led to a leveling off in the growth of offensive systems -- much less to reductions. Moreover, unlike the United States, the Soviet Union has continued to maintain and modernize both a large nationwide air defense system and ballistic missile defenses around its capital (as permitted by the ABM Treaty). In addition, as the President

recently reported to the Congress, the Soviet Union has now deployed a large radar in Central Siberia which almost certainly constitutes a violation of legal obligations under the ABM Treaty, since its associated siting, orientation, and capability are prohibited by this Treaty. The Soviets have also been conducting research in technologies that would be required for more effective missile defenses.

The continual growing Soviet offensive threat to the United States and our allies plus the ongoing Soviet research and deployment of defensive systems offer a powerful motive for reassessing the potential role of defensive systems in our security strategy. At the same time, advances in relevant technologies require us to reassess the feasibility of useful defenses. The conjunction of these issues prompted the President to call for a new assessment of the possibilities for increasing the role of defensive systems in our deterrent posture.

It is to be expected that the technological approaches proposed would vary widely in technical risk and strategic uncertainty. For the first time in history we have the possibility of developing a multitiered system. Such a system could defend against enemy ballistic missiles in all phases of their flight, not only in the terminal phase, where decoys and multiple reentry vehicles (MIRVs) constitute a large number of objects that the defense must cope with. The current technology addresses only the final reentry phase. A capability to intercept missiles in the boost and post-boost phases could defend against a missile attack prior to the deployment of a multiplicity of reentry vehicles and decoys.

We do not yet have enough information for estimating the entire cost of a full research and development program for a multitiered missile defense. The costs of actual development

of various possible systems will, of course, depend on the characteristics of the systems. Clearly, costs of defenses and the trade-offs with offensive forces they will permit and require are among the most critical issues. The costs will, however, be spread over many years, and decisions on the desired magnitude of the effort can -- and should -- be taken at various stages in the program. At this time, one cannot prejudge the extent to which costs of increasingly more effective defense deployments will be warranted by the resultant security benefits and defense savings in other areas.

The role of ballistic missile defenses must be viewed in the context of the overall military and political requirements of the United States. A decision to pursue ballistic missile defenses would have major implications, for nuclear strategy, the prevention of nuclear war, deterrence of aggression, and arms reduction. It is with this broad context in mind that our policy on missile defenses must be shaped. To permit informed decisions we have to conduct research on many aspects of the relevant technology and develop a range of specific choices.

It is likely that components of a multilayered defense, or less than fully effective versions of such a defense, could become deployed earlier than a complete system. Such intermediate versions of a ballistic missile defense system, while unable to provide the protection available from a multitiered system, may nevertheless offer useful capabilities. The development of options to deploy such intermediate capabilities would be an important hedge against an acceleration in the Soviet strategic buildup. If such intermediate systems were actually deployed, they could play a useful role in defeating limited nuclear attacks and in enhancing deterrence against large attacks.

Intermediate defense capabilities would reduce the confidence of Soviet planners in their ability to destroy the high-priority military targets that would probably be the primary objective of a contemplated Soviet attack. The planners' decreased confidence in a successful outcome of their attacks against military targets, war-supporting resources within the United States, or U.S. and allied forces overseas would strengthen deterrence of Soviet use of nuclear arms.

An effective, fully deployed U.S. ballistic missile defense could significantly reduce the military utility of Soviet preemptive attacks, thereby potentially increasing both deterrence and strategic stability. But such a defense could remain effective only if the Soviet Union could not negate it with countermeasures more cheaply than the United States could maintain the viability of the system, or if the two sides agreed to limit offensive missile forces while protecting defensive systems. Effective defenses strengthen deterrence by increasing an attacker's uncertainty and undermining his confidence in his ability to achieve a predictable, successful outcome. By constraining or eliminating the effectiveness of both limited and major attack options against key U.S. military targets and thus leaving only options for attacking urban areas -- which would be of highly questionable credibility -- defenses could significantly reduce the utility of strategic and theater nuclear forces and raise the threshold of nuclear conflict.

It must be recognized, however, that there are uncertainties that will not be resolved until more is known about the technical characteristics of defensive systems, the future arms policies of the Soviet Union, the prospects for arms reduction agreements, and the Soviet response to U.S. initiatives. Important questions to be addressed are: (1) the absolute and relative effectiveness of future U.S. and Soviet defensive systems and how this

effectiveness is perceived by each side; (2) the vulnerabilities of the defensive systems (both real and perceived); (3) the size, composition, and vulnerabilities of each side's offensive forces; and (4) the overall U.S.-Soviet military balance. While these uncertainties cannot be fully resolved, we will learn more about them with the passage of time. Our assessment of these issues will affect design and deployment decisions.

These uncertainties notwithstanding, a vigorous R&D program is essential to assess and provide options for future ballistic missile defenses. At a minimum, such a program is necessary to ensure that the United States will not be faced in the future with a one-sided Soviet deployment of highly effective ballistic missile defenses to which the only U.S. answer would be a further expansion of our offensive forces (penetration aids, more launchers, etc.). Such a situation would be fraught with extremely grave consequences for our security and that of our allies. There is no basis for the assumption that decisions on the deployment of defensive systems rest solely with the United States. On the contrary, Soviet history, doctrine, and programs (including an active program to modernize the existing Moscow defense -- the only operational ballistic missile defense in existence) all indicate that the Soviets are more likely (and better prepared) than we to initiate such a deployment whenever they deem it to their advantage. For the near future, in particular, they are better prepared than we to deploy traditional ("conventional") terminal defenses. U.S. work on ballistic missile defense technology in the 1960s and early 1970s appears to have been an important factor in Soviet willingness to agree to the deployment limits imposed by the ABM Treaty; similar considerations can be expected to play a role in future Soviet decisions on the deployment of ballistic missile defenses.

If U.S. research efforts on defensive technologies prove successful, and are so perceived by the Soviet Union, such

technologies could fundamentally alter the nature of the strategic relationship between the United States and the Soviet Union. Advanced ballistic missile defenses have the potential for reducing the military value of ballistic missiles and lessening the importance of their role in the strategic balance. In reducing the value of these weapons, defensive technologies could substantially increase Soviet incentives to reach agreements reducing nuclear arms. In conjunction with air defense and effective, agreed constraints on all types of offensive nuclear forces, highly effective ballistic missile defenses could drastically diminish the threat of massive nuclear destruction.

Nevertheless, the immediate response of the Soviet Union to a U.S. effort to develop ballistic missile defense is likely to be a continuation of its current political and diplomatic campaign to discredit such defenses. At the same time, the Soviet Union will continue its own efforts on air defenses and on both existing and advanced ballistic missile defenses. The Soviets can also be expected to press ahead with further expansion and modernization of their offensive systems. The Soviets may change their pattern of behavior if they become convinced that the American commitment to the deployment of defense is serious, that there are good prospects for eventual success in the development of ballistic missile defenses, and that such deployments present opportunities for a safer U.S.-Soviet nuclear relationship.

Since long-term Soviet behavior cannot reliably be predicted, we must be prepared to respond flexibly. A research and development program on ballistic missile defense that provides a variety of deployment options will help resolve the many uncertainties we now confront and over time offers the United States flexibility to respond to new opportunities. By contrast, without the research and development program,

we condemn future U.S. Presidents and Congresses to remain locked into the present exclusive emphasis on deterrence through offensive systems alone.

If, for example, the Soviets persisted in attempts to expand their massive offensive forces, a flexible research and development program would force Soviet planners to adopt counter-measures, increasing the costs of their offensive buildup and reducing their flexibility in designing new forces in a manner that they would prefer. Over time, our research and development on ballistic missile defense might induce a shift in Soviet emphasis from ballistic missiles, with the problems they pose for stability, in favor of air-breathing forces with slower flight times. By constraining Soviet efforts to maintain offensive forces and making them more costly, U.S. options to deploy ballistic missile defenses might increase our leverage in inducing the Soviets to agree to mutual reductions in offensive nuclear forces. In turn, such reductions could reinforce the potential of defensive systems to stabilize deterrence. Reductions of the magnitude proposed by the United States in the Strategic Arms Reduction Talks (START) would be very effective in this regard.

In its initial stages a U.S. ballistic missile defense research and development program would be consistent with existing U.S. treaty obligations. Were we to decide on deployment of a widespread defense of the United States, the ABM Treaty would have to be revised. If the results of the research and development program warranted such a decision in the future, it would be appropriate to address it in the context of a joint consideration of offensive and defensive systems. This was the context contemplated at the outset of the SALT negotiations; but while we reached an agreement limiting defenses, our anticipations of associated limitations on offensive forces have not yet been realized.

Both the Soviet national interest and traditional themes in Soviet strategic thought give reason to expect that the Soviets will respond with increased dependence on defensive forces relative to offensive forces. The nature of a cooperative transition to defensive forces would depend on many factors, including the technical aspects of each side's defensive systems, their degree of similarity or dissimilarity, and whether U.S. and Soviet systems would be ready for deployment in the same period. Because of the uncertainties associated with these factors, no detailed blueprint for arms control in the transition period can be drawn at this time. A list of arms control measures might include agreed schedules for introducing the defensive systems of both sides, and associated schedules for reductions in ballistic missiles and other nuclear forces. Confidence-building measures and controls on devices designed specifically to attack or degrade the other side's defensive systems are other potential arms control provisions.

If both the United States and the Soviet Union deployed defensive systems against a range of nuclear threats, it would not diminish the need to strengthen U.S. and allied conventional military capabilities. Moreover, to realize the protection offered by a fully effective strategic defense, we would require air defenses so that the ballistic missile defense could not be circumvented by increased deployments of bombers and cruise missiles. The integration of defenses against air-breathing vehicles with defenses against ballistic missiles requires further study.

Defense against ballistic missiles offers new possibilities for enhanced deterrence of deliberate attack, greater safety against accidental use of nuclear weapons or unintended nuclear escalation, and new opportunities and scope for arms control. The extent to which these possibilities can be realized will depend on how our present uncertainties about technical

feasibility, costs, and Soviet response are resolved. Clearly, the pursuit of defensive systems should not build only on our present policies of maintaining peace; it should also seek to strengthen the effectiveness of our strategic policy in the face of a growing Soviet threat. The essential objective of the U.S. strategic defense initiative is to diminish the risk of nuclear destruction -- contrasted with continued, sole reliance on the threat of nuclear retaliation -- to provide for a safer, less menacing way of preventing nuclear war in the decades to come.

TECHNOLOGIES FOR DEFENSE AGAINST BALLISTIC MISSILES

Six broad areas were addressed by the technologies study team: (1) surveillance of Soviet missile forces, and acquisition and tracking of missile attacks; (2) directed energy weapons for missile defense; (3) more-conventional weapons for missile defense; (4) the control and coordination of the battle between the offensive missile forces and our defenses, together with its requirements for communications and data processing; (5) concepts for an integrated defensive system; and (6) possible Soviet countermeasures and tactics.

The goal of the study was to provide guidance for research and development programs, in particular for the development of technologies that could make possible a defense against ballistic missiles. As a first step, the research and development program should further informed decisions on subsequent engineering programs seeking to test the technologies.

In addition, the study identified demonstrations of key components of a missile defense that could be conducted by the end of this decade. These demonstrations can provide a basis for choosing specific, partial missile defense systems to be deployed by the early 1990s. Such partial systems could defend perhaps a few critical targets, especially against smaller attacks. In the event of a large missile attack, however, many missiles would reach their targets. Yet even the limited effectiveness of a partial system could make a significant contribution to deterrence, by depriving the enemy planner of reliable military results of his attack.

This study dealt only with defenses against ballistic missiles; defenses against bombers and cruise missiles have been evaluated in other studies.

The principal conclusions of this study were that:

- New technologies for ballistic missile defense hold promise that warrants a major research and development effort to provide specific options for defensive systems.
- Through demonstration projects, evidence and measurement of progress on the required technical capabilities can be provided within the next ten years.
- Development of all the technologies essential for a comprehensive ballistic missile defense will require effective coordination through central management for the research and development efforts.
- The most effective defensive systems have multiple layers, or tiers.
- A combination of technologies and special tactics needs to be developed to protect vulnerable components of the future defense system.

A. THE BALLISTIC MISSILE ATTACK

Advances in Soviet and U.S. technology warrant a reevaluation of ballistic missile defenses. Over the past twenty years the Soviet threat from ballistic missiles has increased steadily. For purposes of analysis this study assessed a variety of potential future threats, ranging from an attack with fewer than 100 ballistic missiles and a few hundred warheads to an attack with thousands of missiles launched simultaneously with tens of thousands of warheads. The study focused on the most demanding

case -- a ballistic missile attack, unconstrained by arms limitations, that would impose the greatest stress on a defensive system.

In seeking to determine the best defense, the study team analyzed the characteristics of a ballistic missile throughout all four phases of a typical trajectory (Fig. 1). In the boost phase, the first- and second-stage engines of the missile are burning, producing intense infrared radiation that is unique. A post-boost, or bus deployment, phase occurs next, during which multiple warheads and enemy penetration aids are released from a missile. ("Penetration aids" are objects that accompany a missile attack, designed to saturate defenses.) Next, in the midcourse phase, warheads and penetration aids travel on ballistic trajectories above the atmosphere. In the final phase, the warheads and penetration aids reenter the atmosphere, where they are affected by atmospheric drag.

B. CHARACTERISTICS OF AN EFFECTIVE DEFENSE AGAINST BALLISTIC MISSILES

1. Defense in Depth

For many years now ballistic missile defense studies and experiments have continued to support the conclusion that an efficient defense against large missile attacks would need to be multitiered. Some missiles (or other objects that are part of the attack) will be able to penetrate any one defensive tier; those that have not been intercepted at one phase will move on to the next phase. For example, a ten percent "leakage" in each of three tiers would amount to an overall "leakage" of only 0.1 percent. A single layer that can achieve 90 percent effectiveness is many times less costly than a single layer of 99.9 percent effectiveness. It is thus reasonable to construct a three- or four-layer defense with 99.9 percent effectiveness at far less cost than the equivalent single-layer defense. Finally, a

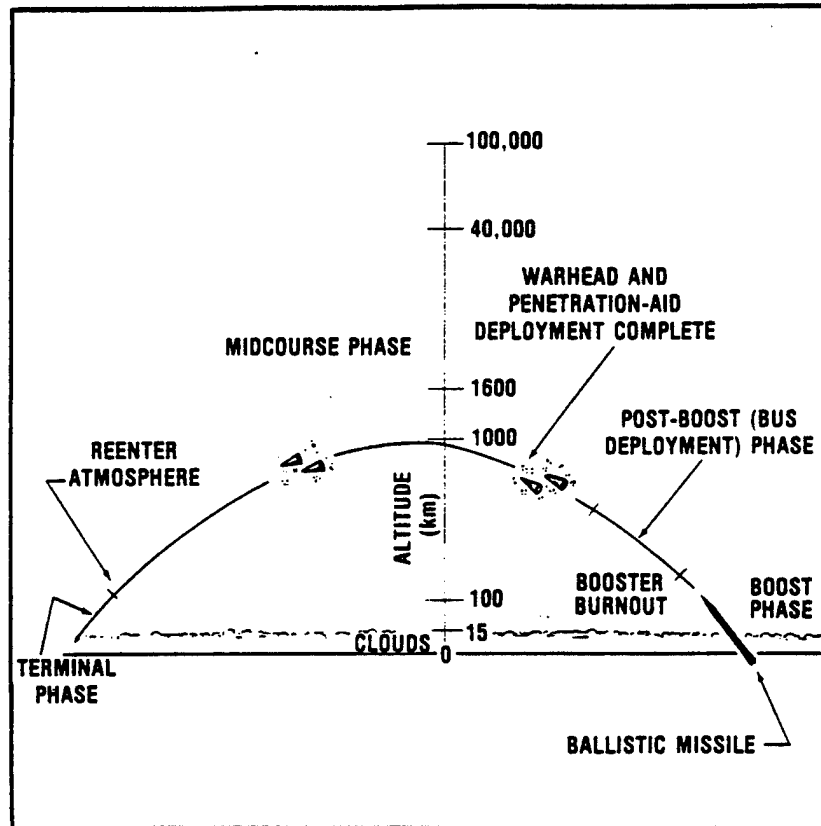


Figure 1: The phases of a typical ballistic missile trajectory. During the boost phase the rocket engines accelerate the missile payload through and out of the atmosphere and provide intense, highly specific observables. A post-boost, or bus deployment, phase occurs next, during which multiple warheads and penetration aids are released from a post-boost vehicle. In the midcourse phase the warheads and penetration aids travel on trajectories above the atmosphere, and they reenter it in terminal phase, where they are affected by atmospheric drag.

multitiered defense complicates an attacker's planning because any single method an attacker used to circumvent the defensive system would not be equally effective for each tier. This compounds the uncertainty of Soviet planners about the effectiveness of a missile attack that they might contemplate.

2. Defense at Each Tier

The effective reach of a terminal-defense interceptor is determined by how fast it can fly and how early it can be launched. Terminal-defense interceptors fly within the atmosphere. The precise timing of their launching is linked to discrimination of their real targets from penetration aids and accompanying debris. Terminal defense must be complemented by area defenses that intercept incoming warheads at long ranges. Intercepts outside the atmosphere, designed to eliminate threatening warheads while they are still in the midcourse trajectory, offer such a complement. Figure 2 illustrates one of many possible concepts for terminal-phase intercept. New technologies make it possible to perform these intercepts with nonnuclear warheads.

Midcourse intercept requires the defense to identify decoys designed precisely to attract interceptors and exhaust the defending force prematurely. Fortunately, in this phase, there is more time available than at later stages to engage objects in trajectory. The midcourse defensive system must provide both early filtering, or discrimination, of nonthreatening objects and continuing warhead attrition to minimize the demand placed on the terminal system. Placing a layer of defense intercept before midcourse is an attractive option. To delay the start of the defensive effort until midcourse would accept the risk of a large increase in the number of objects the defense must cope with because multiple independently targeted reentry decoys would have been deployed. Figure 3 illustrates one of many possible concepts for midcourse-phase intercept.

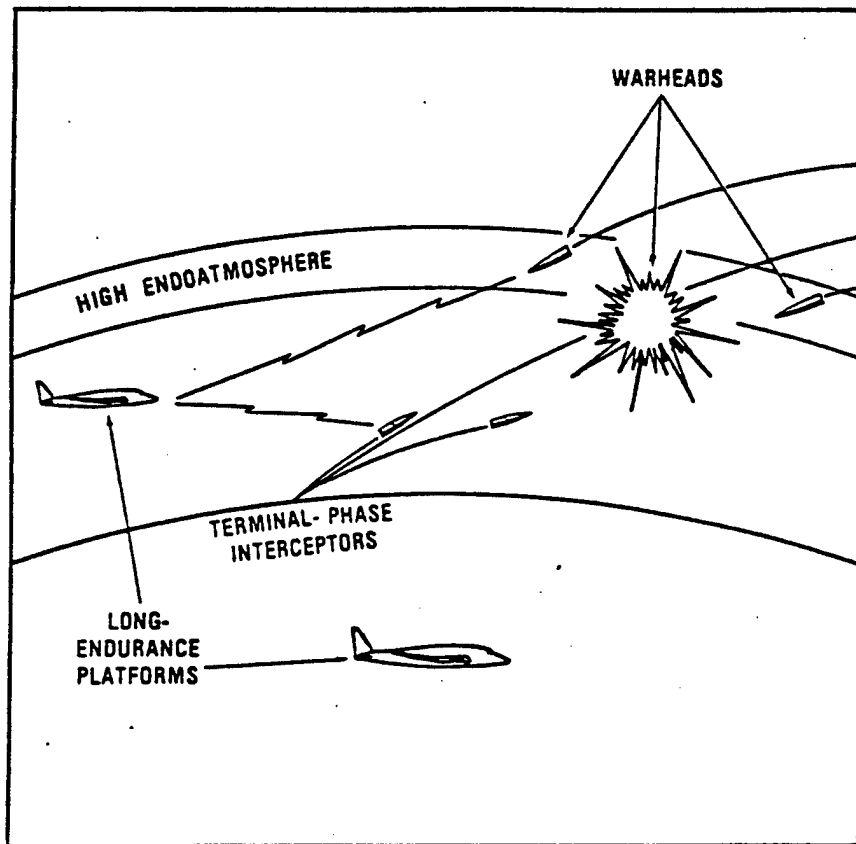


Figure 2: Strawman concept for ballistic missile defense during the terminal phase. This phase is the final line of defense. Threatening objects include warheads shot at but not destroyed, objects never detected, and decoys neither discriminated nor destroyed. These objects must be dealt with by terminal phase interceptors. An airborne optical adjunct is shown here. Reentry vehicles are detected in late exoatmospheric flight with sensors on these long-endurance platforms. The interceptors - nonnuclear, direct impact projectiles - are guided to the warheads that survived the engagements in previous phases.

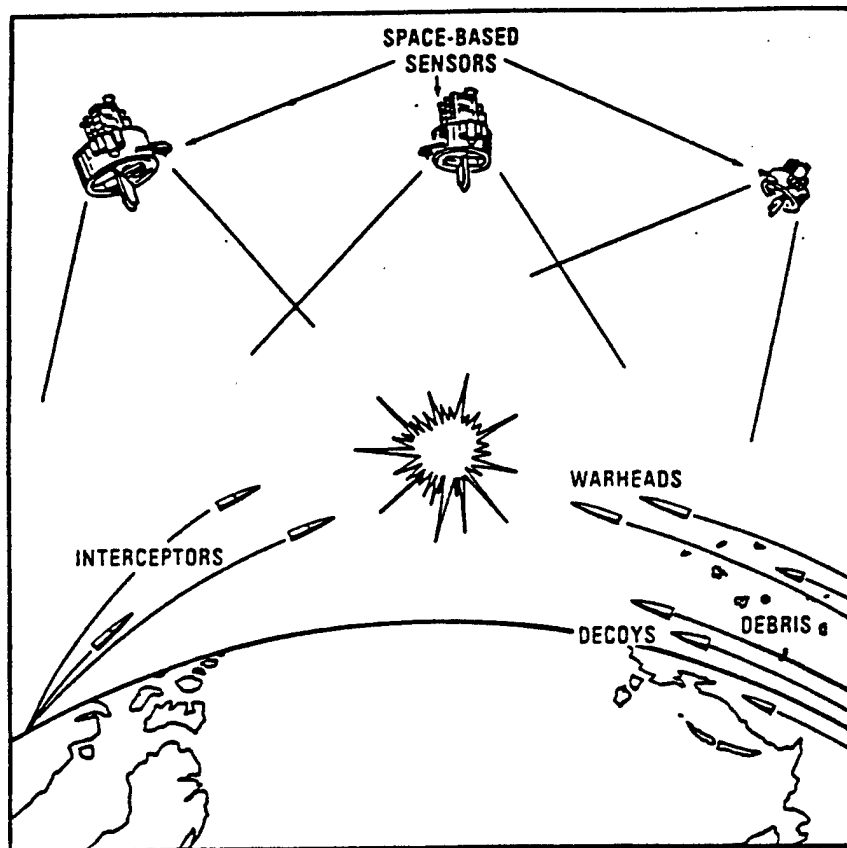


Figure 3: Strawman concept for ballistic missile defense during the midcourse phase. Intercept outside the atmosphere during the midcourse phase requires the defense to cope with decoys designed to attract interceptors and exhaust the force. Continuing discrimination of nonthreat objects and continuing attrition of reentry vehicles will reduce the pressure on the terminal phase system. Engagement times are longer here than in other phases. The figure shows space-based sensors that discriminate among the warheads, decoys, and debris and the interceptors that the defense has committed. The nonnuclear, direct impact projectiles speed toward warheads that the sensors have identified.

In the post-boost phase, the defense must cope with an increasing number of objects in the enemy attack, as decoys and reentry vehicles are deployed. On the other hand, the post-boost phase offers additional time for interception, and an opportunity to discriminate between warheads and deception objects as they are deployed. Figure 4 illustrates one of many possible concepts for boost phase and post-boost phase intercept.

Consequently, an ability to defend effectively against large Soviet missile attacks would be strongly dependent on the effectiveness of a boost-phase intercept system. For every booster destroyed, the number of objects to be identified and sorted out by the remaining elements of a layered ballistic missile defense system is reduced sharply. Because each booster is capable of deploying tens of reentry vehicles and hundreds of decoys, the defense, by destroying the boosters, has to destroy one percent or fewer of the objects it would have to cope with in subsequent phases of the missile trajectory--truly substantial leverage. Yet a boost-phase system is itself constrained by the very short time during which the target can be engaged, and the potentially large number of targets. Because of these constraints, and because of the need to obtain the maximum leverage from all tiers of the strategic defensive system, we need an effective system for surveillance and for commanding and allocating the defenses against a missile attack ("battle management").

Each phase in the layered defensive system presents different technical challenges. But in each phase, a defensive system must perform three basic functions: first, surveillance, acquisition, and tracking; second, intercept and target destruction; and third, "battle management."

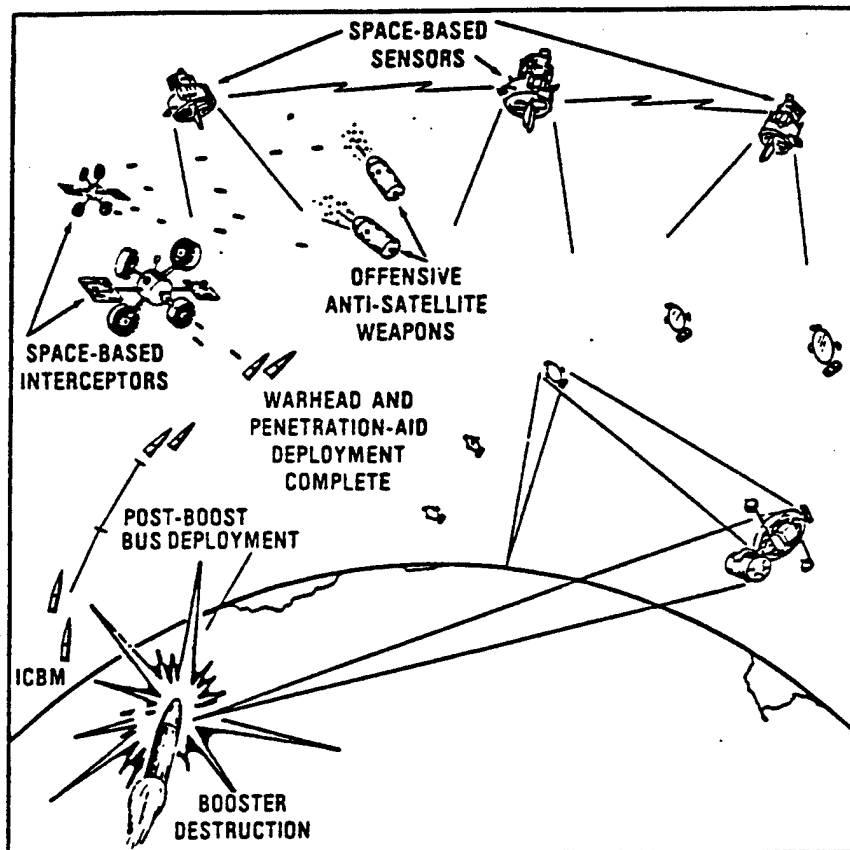


Figure 4: Strawman ballistic missile defense concept for boost-phase. An essential requirement is a global, full-time surveillance capability to detect an attack and define its destination and intensity, to determine targeted areas, and to provide data to boost-phase intercept weapons and post-boost vehicle tracking systems. Attacks may range from a few missiles to a massive, simultaneous launch. For every booster destroyed, the number of objects to be identified and sorted out by the remaining elements of a multitiered defense system will be reduced significantly. An early defensive response will minimize the numbers of deployed penetration aids. The transition (post-boost phase) from boost phase to midcourse allows additional time for intercept by boost-phase weapons and for discrimination between warheads and deception objects. Space-based sensors (three are shown at the top of the figure) detect and define the attack. Space-based interceptors (at the left in the figure) protect the sensors from offensive antisatellite weapons and, as a secondary mission, attack the missiles. In this depiction nonnuclear, direct impact projectiles are used against the offensive weapons.

C. KEY FUNCTIONS OF A BALLISTIC MISSILE DEFENSE

A ballistic missile defense capable of engaging the missile attack all along its flight path must perform certain functions:

- Promptly and reliably warn of an attack and initiate the defense. Global, full-time surveillance of ballistic missile launch areas is required to detect an attack, define its destination and intensity, and provide data to guide boost-phase intercept and post-boost tracking systems.
- Continuous tracking of all threatening objects from the beginning to the end of their trajectories. This objective would allow accurate and timely data transfer from tracking systems to intercept systems, permitting the assignment of intercepts to attacking reentry vehicles.
- Efficiently intercept and destroy the booster or post-boost vehicle. The defense must be capable of dealing with attacks ranging from a few dozen missiles to a massive, simultaneous launch. An early attack on post-boost vehicles will minimize the number of penetration aids deployed.
- Efficiently discriminate between enemy warheads and decoys through filtering of lightweight penetration aids. The system must be capable of rapidly and effectively discriminating decoys or penetration aids from reentry vehicles (warheads). The more effective such discrimination, the greater the cost to the offense in providing the necessary mass and volume for decoys that cannot be filtered out.

- Low-cost intercept and destruction in midcourse. Accurate recognition of the enemy warheads (reentry vehicles) in this phase and a capability to intercept them cheaply will increase the enemy's difficulty and cost in mounting an effective attack. To discourage the Soviet Union from increasing the number of warheads, the cost to the U.S. defense for interceptors should be less than the cost to the Soviet offense for warheads.
- Terminal intercept at the outer reaches of the atmosphere and destruction. The final phase involves the relatively short-range intercept of each reentering warhead.
- "Battle management," communications, and data processing. These are the connecting elements that coordinate all system components to gain effectiveness and economy of force.

D. THE EFFECT OF ADVANCES IN DEFENSE TECHNOLOGIES

Because of recent advances in technology it is now possible to specify how these key functions of an effective ballistic missile defense could be met. For example, two decades ago no reliable means for boost-phase intercept were known. Now several approaches are becoming feasible for boost-phase defenses, based on directed energy concepts (such as particle beams and lasers) and methods for destroying enemy missiles based on kinetic energy (including nonnuclear rocket-propelled projectiles and hypervelocity guns).

Twenty years ago, midcourse intercept was difficult. No credible concepts for decoy discrimination existed, the intercept cost was high, and the unintended damage caused by nuclear weapons then necessary for the interceptor warheads was unacceptable. Today, multispectral sensing of incoming objects with

laser imaging and millimeter-wave radar, tracking through all phases of the trajectory, and inexpensive direct-impact projectiles give promise of overcoming the difficulties of midcourse intercept.

A few years ago, it was not yet possible to design a method to differentiate between penetration aids and warheads at high altitudes. This shortcoming, combined with limited interceptor performance, meant that an effective defense would have required too many interceptors. Now, technological advances provide new ways to discriminate among multiple incoming objects, as well as to intercept missiles at high altitudes. Coupled with an ability to intercept enemy missiles and warheads in boost phase and midcourse and to disrupt coordinated enemy attacks, these improvements would greatly increase the effectiveness of terminal defenses.

But it is not sufficient to develop the capability to destroy incoming targets without also developing the capability to manage the allocation of interceptors and their integration with other portions of a multitiered defense system. Computer hardware and software and signal processing in the 1960s was incapable of supporting such a multitiered defense "battle management." Today, technological advances permit the development of effective command, control, and communications facilities.

New technology also offers more effective solutions to the problem of discriminating between a warhead and a decoy or debris. By using both active and passive sensors, a ballistic missile can be observed during its trajectory to determine the presence of a warhead. An active sensor determines the location and motion of the object by measuring radiation that has been directed from the sensor to the object and reflected from the object back to the sensor; a passive sensor relies on radiation

emanating from the object. Active techniques, such as creating an observable thermal response by an object to a continuous-wave laser, and passive techniques, such as observing with long-wavelength infrared sensors, are possible ways to improve surveillance, acquisition, and tracking of missiles. Both active and passive surveillance techniques are being developed to image an object in order to determine by its appearance what it is. It is important to understand that any one sensor can be defeated, but it is far more difficult to defeat several operating simultaneously.

E. THE NEW TECHNOLOGIES

1. Surveillance, Acquisition, and Tracking

As each potential reentry vehicle begins ballistic midcourse flight accompanied by deployment hardware (or "space junk") and possibly by decoys, every object must be evaluated and accounted for from the beginning to the end of the trajectory, even if the price is many wasted evaluations about what are, in effect, decoys. Defending interceptor vehicles must also be tracked to maintain a complete and accurate status of the engagement.

Midcourse sensors must be able to discriminate between warheads that survive through the post-boost deployment phase and nonthreatening objects such as decoys and debris. They must also provide warhead position and trajectory data to permit timely and accurate employment of interceptors and to assess target destruction. The minimum requirement is to track all objects designated as reentry vehicles, and also to track other objects that might be confusing in later tiers.

Space-based, passive infrared sensors could provide the means to meet this tracking requirement. They could permit

long-range detection of warheads (or cold objects) against the space background and the elimination of simple, lightweight objects, leading to determination of the full trajectories of threatening objects. Laser trackers could also provide validation to determine if targets had been destroyed, as well as precision tracking of objects as they continue through midcourse. As the objects proceeded along their trajectories, data would be handed off from sensor to sensor and the computerized tracking files progressively improved.

For the final line of the defense, the surveillance and tracking would be based, where possible, on the data collected from the midcourse engagement. This task would consist of the sorting of all objects that have leaked through the early defense layers, to identify the remaining enemy reentry vehicles. Objects to be tracked would include reentry vehicles shot at but not destroyed, reentry vehicles hitherto undetected, and decoys and other objects that were neither identified nor destroyed. These possible threatening objects must be assigned to final-phase interceptors.

One innovative concept for that phase involves an airborne optical adjunct--a platform put into position on warning of attack--that would help detect arriving reentry vehicles using infrared sensors (much as space-based sensors had done in midcourse), tracking those not previously selected. Airborne sensors could also provide data necessary for additional discrimination. They could acquire and track objects as they were about to reenter the atmosphere and observe interactions of those objects with the atmosphere from the beginning of reentry. At that point, a laser or radar would precisely measure the position of each object and refine its track before interceptors would be committed.

2. Intercept and Destruction of Threatening Objects

A variety of mechanisms, including directed energy, can destroy an object at any point along its trajectory. The study identified several promising possibilities. A laser relying on advanced technology can be designed to produce a single giant pulse that delivers a shock wave to a target. The shock causes structural collapse. A continuous-wave or repetitively pulsed laser delivers radiant thermal energy to the target. Contact is maintained until a hole is burned through the target or the temperature of the entire target is raised to a damaging level. Examples of such lasers are free-electron lasers, chemical lasers (hydrogen fluoride or deuterium fluoride), and repetitively pulsed excimer lasers.

There are other possible means of destroying incoming warheads. A neutral-particle beam could deposit sufficient energy within a missile or warhead to destroy its internal components. In conventional warfare, guns and missiles destroy their targets through kinetic-energy impact supplemented with a chemical explosive in some cases. In defending against ballistic missiles, homing projectiles propelled by chemical rockets or by hypervelocity guns, such as the electromagnetic gun based on the idea of an open solenoid, could destroy warheads in all phases.

3. "Battle Management"

The tasks of "battle management" are (1) to monitor the global situation, (2) to allocate all available defense weapons (interceptors, etc.), (3) to determine their best use, and (4) to report results.

A layered battle-management system would correspond to the different layers of the ballistic missile defense system, each

layer being semiautonomous, with its own processing resources, rules of engagement, sensor inputs, and weapons. During an engagement, data would be passed from one phase to the next. The exact system architecture would be highly dependent on the mix of sensors and weapons, and the geographical scope of the defense to be managed would determine the structure of the battle management system.

As sensors survey the field of battle, raw data are filtered to reduce the volume. Later processes organize these data according to (1) the size of the object, (2) orbital parameters and positions as a function of time, (3) listings of other data that help identify and assess the threat inherent in the object that is being tracked. In principle, all objects in the field of view of the sensors are candidates for tracking, and all objects that cannot readily be rejected as nonthreatening would appear in the file--the representation of the total battle situation.

Defense system resources include sensors and weapons, the data-processing and communication equipment, and the platforms (or "stations") on which these and other components are emplaced. The assignment of these resources--both sensor and weapon--is a dynamic process requiring reexamination throughout an engagement. For example, sensors must be assigned to sectors or to targets of interest at appropriate times to acquire necessary targeting and tracking data. Weapons must then be assigned to targets as determined by rules of engagement. Defensive resources must extrapolate the present situation into the future to determine the most likely development of the attack and to select a course of action that maximizes the effectiveness of the defense.

F. MEETING THE CHALLENGE

The Technologies Study concentrated on the most difficult aspects of a multitiered, four-phase ballistic missile defense system capable of defending against a massive threat--the technologies that pose the greatest challenge. The study team was primarily concerned with technologies whose feasibility would determine whether an effective defense is indeed possible.

1. Critical Technologies

Several critical technologies will probably require research and development programs of ten to twenty years to be ready for deployment as part of such a ballistic missile defense.

- Boost and post-boost phase intercept. As mentioned earlier, the ability to respond effectively to a very large missile attack is strongly dependent on countering it during the boost or post-boost phases.
- Discrimination. Dense concentrations of reentry vehicles, decoys, and debris must be identified and sorted out during the midcourse and high reentry phase.
- Survivability. A combination of tactics and mechanisms to ensure the survival of the system's space-based components must be developed.
- Interceptors. By using inexpensive interceptors in the the midcourse and early reentry phase, intercept can be sufficiently economical to permit attacks on objects that may not be warheads.

- Battle Management. Tools are needed for developing battle-management software.

There is much still to be done. For example, the management of large computer systems will pose important challenges. Developing hardware will not be as difficult as developing appropriate software. Large packages of software (on the order of 10 million lines of code) for reliable, safe and predictable operation would have to be deployed. Fault-tolerant, high-performance computing would be necessary. Not only must it be maintenance-free for many years, but it must also be radiation-hardened, able to withstand substantial shock, and be designed to avoid a sudden failure of the entire computer system. The management of interlocking networks of space-, air-, and ground-based resources would require the development an accurate means of transferring data between computer systems rapidly and accurately, through system-generated protocols. There must also be a means to reconstitute all or part of the system if portions of it are damaged or made inoperable. In addition, specific ballistic missile defense algorithms will have to be developed for target assignment and a simulation environment for evaluating potential system architectures.

The problem of survivability is particularly serious for space-based components. The most likely threats to the components of a defense system are direct-ascent antisatellite weapons, ground- or air-based lasers, orbital antisatellites, both conventional and directed energy weapons, space mines, and fragment clouds. On the ground, traditional methods to enhance survivability can be effective, such as hardening, evasion, proliferation, deception, and active defense. But to protect space-based systems, these methods must be employed in combination. Ideally, the defense system should be designed to withstand an attack meant to saturate the system. At the very least, the system's most critical points must be protected.

The history of warfare in general, and the interactions of weapons technologies in particular, indicate that for many potentially successful defenses counters have been developed. It is essential, therefore, to consider possible countermeasures to the development of a ballistic missile defense. But countermeasures are likely to compete with other military programs for available resources and thus may result in diminished offensive capability. For example, hardening of booster rockets of missiles (to withstand a boost-phase missile defense) results in either a reduced payload or a shorter range of the offensive missiles.

2. Logistical Support

The study also described research programs on space logistics that would take five to ten years to complete. In order of priority, the requirements are: (1) development of a heavy-lift launch vehicle for space-based platforms of up to 100 metric tons (220,000 pounds one-time payload); (2) ability to service the space components; (3) ability to make available, or to orbit, sufficient materials for space-component shielding against attack; (4) ability to transfer items from one orbit to another; and (5) multimewatt power sources for space applications.

Based on the Defensive Technologies Study, the Department of Defense, along with the Department of Energy, has established a new program for the President's Strategic Defense Initiative (SDI). Existing programs relating to the SDI have been focused in five technology areas, and additional funding will be sought to pursue them aggressively. In recognition of its importance, the Strategic Defense Initiative will be centrally managed and will report directly to the Secretary of Defense.

The Strategic Defense Initiative represents one of the most important technological programs the nation has ever embarked upon--a great hope for the future--but it does not represent a deployment attempt, nor is it a substitute for current strategic and conventional force modernization or for arms control. Rather, it will create the technological base for sound deployment decisions. SDI will use America's greatest assets, our creativity and our ingenuity, to lessen the awesome threat of nuclear weapons.

FY85 BUDGET PROPOSAL

The FY 1985 budget request for RDT&E is highlighted by the new thrust in strategic defense technology. In March 1983, the President announced a Strategic Defense Initiative. This initiative is designed to provide future Presidents with options for enhancing deterrence through defenses. Last summer the Defensive Technologies Study, also known as the Fletcher Report, confirmed that new technologies justify a major research effort to pursue multilayered strategic defense against ballistic missiles. Strategic defense would be designed to destroy incoming ballistic missiles and their warheads at each of the four stages of their trajectory: (1) shortly after launch, (2) as individual reentry vehicles are deployed, (3) as the reentry vehicles travel through space, and (4) as they reenter the atmosphere and approach the target. The future effectiveness of such a system depends upon our ability to develop sensors and battle management systems capable of coping with the complexity of possibly thousands of missile launches and the associated deception efforts and tracking requirements. It is a large task; however, we already possess some of the necessary building blocks and are undertaking a vigorous research and technology program to obtain the others.



DEPARTMENT OF DEFENSE STRATEGIC DEFENSE INITIATIVE FY 1985 BUDGET

(\$ Millions)

<u>Major Technical Areas</u>	<u>FY 84 Appropriation in related areas</u>	<u>FY 85 Planned Prior to President's Speech</u>	<u>FY 85 SDI Budget</u>	<u>% real growth* from FY 84</u>	<u>% growth from FY 85 prior plan</u>
Surveillance, acquisition, tracking & kill assessment	366.5	735.7	721	88	-2
Directed energy weapons	322.5	369.1	489	45	32
Kinetic energy weapons	195.8	296.1	356	74	20
System concepts, battle management, and C ³	82.7	89.5	99	14	11
Survivability, lethality and subsystems	<u>23.5</u>	<u>36.6</u>	<u>112</u>	<u>355</u>	<u>208</u>
TOTAL	991.0	1527.0	1777	71	16

*4.7% price escalation from 1984 to 1985 for RDT&E TOA.

INDUSTRIAL ASPECTS

- The need for Strategic Defense Initiative is there; it transcends the options of any one Administration.
 - There is a legitimate desire throughout the West for nuclear arms reductions.
 - Soviets are vigorously pursuing strategic defense; passive defenses, ballistic missile defenses, and air defenses.
 - Deterrence based more on defenses may provide a more stable world.
 - Our posture should never be confronted with a strategic situation where the Soviets break out of the ABM Treaty, deploying effective advanced ballistic missile defenses to augment their major investments in air defenses and passive defenses, and we are unable to maintain a stable balance by deploying effective advanced defenses of our own.
- New technologies offer the promise of effective defensive systems.
 - The overall conceptual approach calls for destruction of the ballistic missiles in all of their flight phases; boost-phase, post-boost, midcourse, and terminal.
 - By repeatedly attempting to destroy the attacking nuclear missiles in each of these phases, adequate defense capability might be achieved without requiring perfection from any defense components.

- Advances in microelectronics, microcomputers, optics, lasers and particle-beam devices, and data processing software have provided the potential technology building blocks.
- These technology building blocks have allowed us to configure advanced optical and radar sensor concepts, miniature kinetic kill vehicles, and directed energy weapon concepts that might provide the potential ability to destroy ballistic missiles in all their flight phases.
- We have defined an R&D program that will allow us to demonstrate these potential strategic defense technologies.
 - The program will be pursued with discipline and stability.
 - It will be strongly centrally managed and will report at the highest level in DoD.
 - We will utilize the expertise and capabilities of the Services, appropriate Defense Agencies, and other governmental departments for its accomplishment.
 - Our initial emphasis has been on defense against ballistic missiles, the most destabilizing component of the threat. We also also addressing potential defenses against air-breathing threats.
 - The R&D program is focused on the demonstration of the necessary defensive capability in five major areas:
 - Search, acquisition, tracking, and kill assessment (SATKA)

- Directed energy weapons (DEW)
 - Kinetic energy weapons (KEW)
 - System concepts, battle management, and C3
 - Survivability and supporting technology
-
- In the SATKA area, we plan to demonstrate an advanced boost-phase surveillance and tracking system, an LWIR space surveillance and tracking system, an airborne optical sensor system, and radar and optical imaging concepts.
 - In DEW, we are pursuing short- and long-wavelength lasers, neutral particle beam concepts, and the appropriate pointing and tracking system demonstrations.
 - In the kinetic energy weapons area, we plan to demonstrate an advanced nonnuclear endoatmospheric interceptor missile, a miniature homing midcourse interceptor missile, a space-based miniature kill-vehicle system, and advanced hypervelocity launchers. We plan to demonstrate a new terminal defense system capability using a ground-based radar, an airborne optical sensor, and an endoatmospheric nonnuclear interceptor.
 - We will continue to examine the most appropriate overall system concepts and architectures, as well as sequential approaches to their employment. Battle management, command and control approaches, and the supporting data processing hardware and software development techniques will be addressed. There will be special emphasis given to system survivability (especially of potential space-based components) and to lethality (especially for directed energy weapons).

-- The program is appropriately funded. The first full year of operation will be FY 1985; we intend to initiate some key efforts in the remaining time in 1984. The out-year funding requirements have been estimated but not finalized. These estimates show an appreciable growth as the demonstrations continue.

- Industry has opportunities to contribute to the needed technology and concept demonstrations.

-- Our initial focus is toward defense against ballistic missiles.

-- We are looking for new, creative ways of satisfying our defensive technology needs.

-- Industry has the necessary abilities to provide this defensive technology.

SCIENTIFIC ASPECTS

- Emphasize that the SDI is a research program.
 - Program is not a deployment decision.
 - Full participation of scientific community will be sought.
 - There will be substantial opportunities for scientific contributions to the work associated with the SDI.
- Recognize that some in the scientific community have reservations about the policy and/or technology aspects of SDI.

Key Concerns of Some Scientists

- A general concern with the wisdom of defensive systems on policy grounds, and a specific desire to deflect an "arms race" in space.
- A belief that the scientific and technical basis of the SDI is extremely weak. In particular, that defensive systems are easily overcome with countermeasures, and that the competition between measures and countermeasures will accelerate the "arms race" without improving our security.

Specific Responses to Concerns

- Arms race and other policy concerns:
 - Arguments similar to those given to other communities should address general policy concerns. But it should

be stressed that considerable analysis by the academic policy community will be supported in conjunction with the SDI. No decisions on deployment have been made at this time.

- The idea that military activities in outer space are somehow more undesirable than military activities on earth has no merit. Indeed, it would be strange to take the position that outer space must be kept free of military systems the better to permit the use of space to attack cities or other targets on earth.
- The SDI is a research program, not an armaments program.
- There are already "arms" that act against assets in space. The Soviets have tested and deployed ASAT weapons already.
- The SDI research program may be regarded as buying options for the future as a hedge. Before defensive strategies can be fully analyzed, we must have missile defense technological answers available.
- Deterrence based on defense may provide a more stable world.
- Scientific basis of SDI weak:
 - Some of the opponents may not be familiar with recent advances in the relevant technologies.
 - Fletcher panel and scientific review group originally negative; changed mind after reviewing data.

- Countermeasures clearly not as easy as opponents say; major element of program is to assess lethality and develop survivability technology.
- Program obviously must be flexible; as we learn more about technologies of defense and possible countermeasures, adjustment will be possible.

Issues to Avoid, Things NOT to Say

- Discussions of ultimate costs; only a comprehensive research program like SDI can give us those answers.
- Discussions of systems concepts or war scenarios; the program is a research program, not a system development effort.

ARMS CONTROL AND NUCLEAR FREEZE ASPECTS

- The Strategic Defense Initiative (SDI) seeks to examine the potential of enhancing our deterrence posture in the future by putting it on broader basis: balanced, survivable defensive forces; balanced, survivable, and modest offensive forces; and strong, verifiable arms control measures.
- The SDI also seeks to provide a prudent response to extensive Soviet R&D activities in this area as well as hedge against the potential of unilateral Soviet deployment of advanced defensive technologies.
- The SDI does not lock us into a decision to develop and deploy defensive systems, nor does it prejudge any particular system configuration, either space based or ground based. Rather, it is a broad research program that is designed to answer a number of technological questions that must be answered before the promise of defensive systems can be fully assessed.
- This initiative, contemplating only research on a broad range of defensive technologies, is fully consistent with current U.S. treaty obligations:
 - The ABM Treaty generally prohibits the testing and development of most advanced ABM systems and components, but permits laboratory research on such systems and components
 - The Outer Space Treaty prohibits the deployment of nuclear weapons or weapons of mass destruction in space. The U.S. program of broad-based R&D is entirely consistent with the Treaty. The characteristics a defensive system might have in terms of new technologies,

whether space based or not, are not likely to be set in the near future.

- Should a decision be made by a future President and a future Congress to deploy an advanced defense capability, such defenses could complement the U.S. goal of significant reductions in offensive nuclear armaments:
 - Advanced defenses have the potential of reducing the value of ballistic missiles, and thus might provide an incentive for negotiated reductions.
- With any decision in the future to develop and deploy defensive systems, arms control would play an important role in easing the transition to a greater reliance on defenses and in enhancing the deterrence and stability potential of such deployments. Specifically, arms control measures could be important in maintaining limits to the size of offensive forces, in maintaining a balance of offensive and defensive forces, and in enhancing the survivability of offensive and defensive forces. Thus, far from being discarded in the event a decision to deploy defensive systems were made in the future, the role of arms control measures in helping to maintain stability and reduce the threat of war would actually be broadened.
- Because of the important role that arms control can play, the U.S. will maintain a close dialogue with the Soviet Union to clarify our intentions with regard to the SDI and to set the stage for the possible institution of cooperative measures to ease the transition to a greater reliance on defensive systems, should the promise of such technologies be borne out by our research.

- In the meantime, we must complete the modernization of our deterrent forces and consummate equitable and verifiable arms reduction agreements with the Soviet Union in order to establish and maintain a stable and secure balance in the years ahead.

Specifically for nuclear freeze audiences

- The primary goal of the proponents of a nuclear freeze (as distinct from methods of achieving it) is to reduce the risk of nuclear war. The SDI concept represents a new and promising approach to removing the threat of nuclear ballistic missiles. Freeze proponents should, therefore, recognize how the SDI can help to achieve their objective, and they should evaluate the initiative in light of this.

ALLIED CONSIDERATIONS

- The U.S. commitment to the defense of its allies is not in any way changed by the Strategic Defense Initiative.
- The initiative seeks to explore the potential of emerging technologies to enhance deterrence by significantly reducing the effectiveness of ballistic missiles.
- It does not constitute a decision to fully develop and deploy defensive systems. Rather, it is a research program that is designed to answer a number of technological questions that must be answered before the promise of defensive systems can be fully assessed.
- The decision to pursue a defensive technologies program is not solely a U.S. initiative. The Soviet Union currently is:
 - Upgrading the world's only active BMD system
 - Pursuing R&D on a rapidly deployable ABM system
 - Pursuing research on an advanced defensive technologies program
 - Constructing a large phased array radar in a manner almost certainly inconsistent with Soviet obligations under the ABM Treaty.
- A U.S. defensive technologies program, therefore, is a prudent hedge against unilateral Soviet deployment:
 - Unilateral Soviet deployment would result in Soviet military superiority and adversely affect U.S. and allied security.

- Close consultation will continue as the program progresses.
- The U.S. intends to continue to work closely with its allies to ensure that, in the event of a future decision to deploy defensive systems, allied, as well as U.S., security against aggression would be enhanced. Moreover, any decisions made in the future concerning whether to deploy defensive systems would be made in full consultation with our allies.
- The research effort envisaged by the President's initiative is consistent with current U.S. treaty obligations, contemplating only research on a broad range of defensive technologies.
- Should a decision be made in the future to deploy an advanced defense capability, such defenses could complement the U.S. goal of significant reductions in offensive nuclear armaments:
 - Advanced defenses have the potential of reducing the value of ballistic missiles, and thus increasing the likelihood of negotiated reductions.
- With any decision in the future to deploy defensive systems, arms control could play an important role in easing the transition to a greater reliance on defenses and in enhancing the deterrence and stability potential of such deployments.
- The initiative in no way signals a shift in priority away from the modernization of strategic and intermediate-range nuclear assets and conventional forces essential to the maintenance of deterrence in the decades ahead.

QUESTIONS AND ANSWERS ON THE PRESIDENT'S STRATEGIC DEFENSE
INITIATIVE

Strategy

Q: Why change our offensive-dominant strategy when it has prevented a major confrontation between the U.S. and the Soviet Union for more than three decades?

A: First, it should be recalled that until the early 1960s, the U.S. had substantial effort in active defense. The SDI is introduced to examine the potential of emerging technologies to support a greater reliance on defensive systems in our deterrence posture. Second, offense-dominated deterrence has prevented aggression, but it has not prevented a continuing increase in Soviet offensive arms. And, thus far, arms control agreements have failed to bring this offensive buildup under control. The President's Strategic Defense Initiative is motivated by a desire to create the option for a future move away from a situation where the threat of retaliation is our only means of deterring war.

In addition, we see a continuing trend in improving Soviet defenses of all types. Should the Soviets complement their extensive air defenses and various passive defenses with effective ballistic missile defenses, the capability of an offense-dominated U.S. deterrent, with no corresponding defensive component, would be seriously reduced and stability would suffer. The SDI, as a minimum, provides a prudent hedge against that contingency.

Q: Will we eliminate all our offensive nuclear forces if a defense against ballistic missiles is deployed?

A: No. At this time we cannot anticipate that our strategic

offensive capability would continue. It would remain the element that imposes costs of risks on a potential aggressor. It would continue to play a role in our long-term commitments to allies and friends. Strategic defenses complement appropriately sized offensive forces for the foreseeable future. They don't make them irrelevant in deterring aggression, but they significantly reduce their utility in supporting or planning aggression.

Q: How would we transition from an offensive-dominated posture to one with an increasing emphasis on defensive systems?

A: The nature of a U.S.-Soviet transition to increased reliance on defensive systems would depend on many factors, including the technical details of each side's defensive systems and their degree of similarity or dissimilarity, and whether U.S. and Soviet systems would be ready for deployment in the same period. Possible arms control provisions might include: negotiated schedules by which the defensive systems of both sides would be phased in; phased reductions in ballistic missile and other nuclear forces; data exchanges on offensive and defensive system numbers and capabilities; and controls on the development, testing or deployment of devices designed specifically to attack or degrade defensive systems.

Q: Is it not true that a successful U.S. defense against ballistic missile systems would give the United States a first-strike capability?

A: No. The U.S. does not seek such a capability. Our strategic force modernization plans are designed to strengthen stability, and our efforts in arms control are directed toward achieving balanced verifiable reductions and encouraging a shift to more stabilizing systems. Strategic defenses can play an important role in helping to deter a

first strike. Incentive for a first-strike depends on the aggressor's assurance of success and his consequent ability to execute a planned, effective strike well enough to make the risks of aggression acceptable. It should also be recalled that during the period when the U.S. had a monopoly in nuclear arms, and afterwards when it had superiority plus significant (air) defenses, the U.S. never contemplated a first strike.

Q: Could not a defense create great instability? With our prospectively growing inventory of D-5 and MX, would it not be reasonable for the Soviets to fear that a U.S. first strike would leave them unable to threaten an effective counter-attack, and therefore, in a severe crisis, tempted to launch a first strike of their own?

A: The SDI is being pursued to examine the potential of developing a truly effective defense capability. If a truly effective system proves feasible, it would increase stability by eliminating the utility of preemptive or first-strike attacks. This tendency could be further reinforced by an arms control environment emphasizing a defense capability and significantly reduced offensive force levels.

Q: Wouldn't defense against ballistic missiles just lead to another arms race without increasing security for either nation?

A: No. Effective defensive systems could well complement our efforts in arms control to help channel modernization into more stabilizing directions. If defensive systems with sufficient effectiveness to enable the U.S. and the Soviet Union to decrease their dependence on offensive systems prove feasible, the security of both nations could be significantly enhanced at reduced levels of offensive arms.

Q: Can defensive systems be made impregnable? If not, isn't the whole purpose of having a defense defeated?

A: While an impregnable defense against ballistic missiles is probably not possible, such a capability is not necessary. Imperfect but effective defenses can play havoc with attack plans by, at worst, creating great uncertainty as to the likely success of an attack and, at best, denying all attack objectives. Deterrence can be significantly enhanced by effective, although not perfect, defensive systems.

Q: If the President's initiative and offensive force modernization program are both important, to which does the Administration give the highest priority? Surely not all the offensive force programs that the Administration has advanced are coequal in importance.

A: The President has given a high priority to the Strategic Defense Initiative because of its potential to decrease our current dependence on offensive arms to maintain deterrence. However, defense technologies are not sufficiently mature or understood to permit us to take near-term advantage of them or to fully assess their promise. These are technologies that are years away from potential realization of their promise. The SDI, through a focused research program, seeks to establish the technical feasibility of defensive systems. Once that is accomplished, and until such time as a decision is made by a future President and Congress to deploy defensive systems, we must depend on capable, modernized offensive forces as the principal source of effective deterrence. Therefore, the President's offensive force modernization program must remain a high national priority.

Q: Would the U.S. be forced to attack Soviet satellites that could negate our space-based defenses?

No. One aim of the Strategic Defense Initiative will be to determine what defensive measures, e.g., hardening, redundancy, self-defense, etc., would be needed to make a defensive system survivable. At the same time, we would also develop arms control initiatives that could aid the survivability of a defensive system.

Q: Why is the Strategic Defense Initiative being pursued now?

A: There are really three reasons for the President's initiative. First, there is an increasing recognition that effective defenses against ballistic missiles have the potential of enhancing deterrence and stability beyond what can realistically be expected from a military posture oriented solely toward offensive arms. Second, several breakthroughs in sensor, data processing, and directed energy technologies during the last 5-10 years have made an effective defense against ballistic missiles appear achievable. And third, it is clear the Soviets have long been pursuing their own strategic defense initiative, and a world in which only the Soviets had effective defenses against missile attack would not be congenial to the survival of this nation.

Q: Might the Soviets decide not to allow U.S. deployment of space-based defenses that could greatly degrade the capabilities of their offensive forces? Would they have incentive to disable the U.S. systems with antisatellite weapons before they become operational?

A: The U.S. would hope that, if effective defenses are achievable and can enhance deterrence, the Soviets would agree explicitly or tacitly to mutual moves toward greater reliance on defense and to refrain from attempts to threaten the other side's defenses. Moreover, a phased deployment of a moderately effective defense that could deter

aggression against our offensive forces could also prevent interference with later deployments of more effective defensive systems. A major part of the rationale for pursuing the U.S. research program, however, is to ensure that we are not faced with the situation of a unilateral Soviet defense that could threaten stability and make a preemptive attack more likely.

Q: The Soviets have recently announced a "mobilization" of their people and their industry to respond to NATO Intermediate Nuclear Force deployments, an action that they also claim reflects their assessment that the U.S. plans further hostile moves. Wouldn't the new U.S. Strategic Defense Initiative reinforce this view and create a similar response from the rest of the world?

A: Our allies are not fooled by the recent Soviet rhetoric regarding NATO Intermediate Nuclear Force deployments. Most of the announced Soviet responses to the deployments are programs they already planned and would have implemented regardless of the deployments. The Soviets' statements regarding their assessment of the Administration should be viewed in light of their efforts to keep the global "correlation of forces"--military, economic, and political power--moving in their favor.

The SDI is not a hostile initiative. We seek technology that could in the future allow deployment of a system to reduce dependence on the threat of nuclear retaliation as the basis for allied security and enhance deterrence. Our research program, which is fully consistent with all treaty obligations, should help stabilize world power relationships by helping to create the option for future defenses that could thwart successful nuclear attack.

Q: Would not the formation of a unified space command be a strong indication that the Strategic Defense Initiative is really aimed at deployment of antimissile defense?

A: The decision whether or not to form a unified space command is independent of the decision to proceed with the research program of the Strategic Defense Initiative. However, as research progresses on promising options for conceptual systems, it will become increasingly important to involve the military commands that would operate those systems in the event their promise is realized and a decision to develop and deploy them is made. Such involvement is necessary to insure that the evolving options are militarily operable, logistically supportable, and otherwise capable of being integrated into military use, should that be deemed appropriate. If formed, a unified space command, as a potential operator of future strategic defense systems, should closely follow and evaluate the progress of strategic defense research in order to develop long range military planning options and advise the program manager regarding operational aspects.

Arms Control

Q: Will the U.S. need to base nuclear weapons in space to make the system work?

A: The research program will shed light on which technologies would be most likely to succeed. There is no indication that basing nuclear weapons in space would be required for an effective defense against ballistic missile systems. The U.S., consistent with our treaty obligations, has no plans for such basing.

Q: Does the President's initiative mean we intend to change or withdraw from the ABM Treaty?

A: No. The President's initiative calls for pursuing research to investigate the potential of defensive technologies in eliminating the threat of nuclear-armed ballistic missiles. As the President noted in his March 23, 1983, speech, this is entirely consistent with all our current treaty obligations. Hence, there is no need to change the ABM Treaty at this time.

Q: The ABM Treaty provides for initiating discussions if changes are contemplated. Has the Administration entered into such discussions with the USSR? Even if the Administration believes such discussions are not legally required by the Treaty, would it not make good sense to exchange views with the USSR to ascertain its attitude and possible reactions?

A: While we have discussed our missile defense program in a preliminary fashion with the Soviet Union, no discussions have been held with respect to changing the provisions of the ABM Treaty since we do not anticipate a need for such

changes at this time. The primary purpose of our ballistic missile defense program is to explore the appropriate missile technologies, not deploy them. If, in the future, these technologies prove capable of supporting a shift in our deterrence policy to an increased reliance on defensive systems, we will, of course, discuss the matter thoroughly with the Soviet Union.

Q: It is difficult to imagine the U.S. committing itself to a costly research program which, if successful, would not result in the need to abrogate the ABM Treaty. If this isn't what the Administration has in mind, how can the Congress be asked to approve such a massive expenditure of funds at a time when our deficits already threaten economic recovery?

A: Congress will, of course, be kept fully informed of the progress of this research effort. The Strategic Defense Initiative program is intended to explore the potential of defensive technologies. At this point, because the technical/military feasibility of defensive systems has not been established, we can make no commitment to deployment. We must first test the promise of these technologies in a rigorous, thorough research program; a program that, incidentally, does not entail a massive expenditure of funds, but rather a relatively modest increase in funding over what was already planned for related technologies prior to the initiation of the SDI.

In addition, we should keep in mind that the decision to conduct ballistic missile defense research is not unique to the United States. Long a believer in defensive as well as offensive forces, the Soviet Union has for a number of years pursued advanced ballistic missile defense technologies and is the only country in the world which maintains an operational ballistic missile defense system. If the Soviet

Union, because of its continuing research efforts, were to unilaterally deploy an effective ballistic missile defense system, our security, as well as that of our allies, would be seriously threatened.

The Strategic Defense Initiative is not just a research program, but an essential investment in our nation's future and a critical hedge against future Soviet options.

Q: What impact would a move towards reliance on defensive systems have on efforts to control offensive nuclear arms?

A: The SDI may have no immediate impact on arms control. The Soviets have recognized the need for negotiated reduction in strategic offensive forces, and we look forward to their returning to the table to work toward a balanced and verifiable agreement.

In the longer term because effective, advanced defenses have the potential for reducing the effectiveness, and thus the value, of nuclear-armed ballistic missiles, they also have the potential for increasing the incentives for negotiated reductions of offensive nuclear weapons.

Q: Is the SDI not simply another step toward the militarization of space?

A: The SDI is focused on establishing the technological base from which a defensive system could be crafted. Placing defensive weapons in space is a possibility, but it is not the goal of the initiative. The SDI should determine the advantages, as well as the disadvantages, of a range of possible technologies. Any ultimate decision on the extent to which weapons should be stationed in space would be based on the potential benefit to the security of the U.S. and our allies.

Q: How can one develop defenses against ballistic missiles without simultaneously developing an ASAT capability?

A: Virtually any weapon entering space has a potential ASAT capability. Weapon systems designed to identify, track, and destroy missiles or reentry vehicles in space would have potential for use against satellites. It is for this reason that the SDI includes a substantial effort on identifying means of enhancing the survivability of space assets.

Q: Won't pursuit of defenses make the Soviets reluctant to reduce offensive arms, especially in the near term before they are confident about their defenses?

A: We cannot predict with certainty what the Soviet reaction to the SDI will be. In the short term, we anticipate they will (a) continue to improve their offensive nuclear forces, possibly including work on potential countermeasures to the SDI programs, (b) continue their large effort in both existing ABM systems and advanced defensive systems, possibly including espionage and other attempts to penetrate our programs, and (c) begin a major propaganda campaign designed to halt the SDI while their own work continues. If the Soviets perceive we are serious in our efforts to explore possible advanced BMD systems, it is certainly possible that this will create additional incentives for them to agree to arms reduction agreements for offensive systems.

Technology

Q: Is a space station a critical element in an effective ballistic missile defense?

A: The Fletcher study pointed out that elements of a defense deployed in space would require servicing and replenishment that might well be carried out by a permanent manned presence in space. The study recommended that manned and unmanned alternatives should be examined. However, the space station as proposed to the President has not been defined with a defensive mission in mind, and it is quite separate from the SDI.

Q: What threat environment was assumed in developing the Strategic Defense Initiative (SDI) program?

A: The Fletcher study considered three scenarios: a worst case with over 30,000 attacking warheads; a threat constrained by treaty to perhaps 5,000 warheads; and a limited-objective or third-party attack of several hundred warheads.

Q: What are the most critical areas to be developed in order of their required effort?

A: Our ability to accomplish boost-phase intercept is the most stressing technically. Almost equally difficult is the capability to accurately discriminate between warheads and decoys. Detailed analyses of these technical problems and likely solutions are addressed in the classified internal reports upon which the SDI is based.

Q: What is the present state of laser technology?

A: Chemical infrared (IR) laser technology is more mature than other laser concepts. We have begun to pursue shorter-wavelength chemical lasers, as well as promising short-wavelength laser concepts using free-electron lasers or excimer lasers. However, significant work is needed in each area before we can confidently expect any of these technologies to reach the power levels required for an effective defensive system.

Q: It has been proposed that we move quickly to deploy a chemical laser system. Is this a viable approach and what capabilities would it give us?

A: We have examined the readiness of a variety of options, including IR chemical lasers, to perform the ballistic missile defense mission. There are a number of serious technical questions with even the more mature IR chemical laser concepts. In addition, the effectiveness of such a system against current or anticipated threats is uncertain. The SDI program is structured to address these unknowns for chemical lasers as well as a number of alternative laser concepts.

Q: Couldn't the Soviets rapidly and effectively deploy countermeasures which would render a laser ballistic missile defense system ineffective?

A: It is possible to retrofit current Soviet boosters for hardening against currently feasible laser threats. However, this hardening would take 5-10 years and significantly reduce payload and probably accuracy. The effectiveness of such quick fixes against systems which we could have available in the mid 1990s is very uncertain, and it is the subject of substantial work proposed within the SDI. In the longer term (15-20 years) the Soviets could develop a new

generation of boosters which would be effective against some defensive systems such as lasers. The new boosters would probably have significantly less payload and might even be only single-warhead systems. However, the ability of these specially designed boosters to penetrate a multi-layered defense with many different kill mechanisms is not likely to be high.

O: Do directed energy weapons employing nuclear explosives play a significant role in the SDI?

A: Some directed energy concepts use a nuclear explosive as an energy source. The feasibility and effectiveness of these approaches will be examined as part of the SDI.

Q: Many noted scientists claim that "Star Wars" technology as embodied in directed energy concepts will never work, nor be effective. Why do you believe them wrong?

A: The SDI is not based solely on directed energy weapons, or any other single technology. Many recent advances make the potential for an effective missile defense appear good. For example, substantial strides in electronics and sensors now make it possible to accurately discriminate between warheads and decoys. New computer capabilities make it possible to manage a defense against thousands of simultaneously attacking warheads. New sensors are small enough and fast enough to permit the development of small, relatively cheap interceptors. The members of the Fletcher panel had similar reservations when they began their deliberations. At the close of their study, they took a far more optimistic view.

Q: Can't midcourse and terminal defenses be cheaply defeated with decoys and jamming?

A: A mix of sensors would allow accurate discrimination of warheads from decoys and other objects. Fully utilizing new optical sensors would make jamming very difficult, if not impossible.

Q: What is your assessment of the High Frontier concept being advocated by General Graham? What is your estimate of the cost of such a system and how soon could it be deployed?

A: The High Frontier concept provides some ideas which we believe have great merit, both for defending space-based assets and for ballistic missile defense. We are proposing a substantial effort to fully flesh-out concepts similar to the High Frontier proposals with respect to benefits, performance, survivability, and costs. However, it must be pointed out that the major issue with the High Frontier concept is in the surveillance and battle management area, rather than in the effectiveness of such an approach. It is not possible at this time to determine any of these aspects, nor to compare them with other options. It is for this reason that we are concentrating on a research and technology effort.

Q: How vulnerable would the space-based assets be to attack? How could they be defended?

A: Space-based assets must be able to withstand potential attacks from other defensive systems. We believe that a combination of tactics, such as maneuvering, hardening, shielding, and even escort defense with a defensive satellite (DSAT) "shootback" capability, could provide the necessary degree of survivability. While it is always possible to attack and destroy a single component with a concerted effort, the cost of doing so can be so prohibitive that an opponent will not attempt it. This situation is no different from any other military engagement, such as a submarine

battle, for example. While it is possible to find and destroy some submarines with a concerted effort, it is not currently possible to stop all or even most of them. Space element survivability is similarly a complex issue. We are recommending a substantial effort in this area.

Q: Can't simple countermeasures such as "space mines" easily defeat a set of space assets?

A: We have developed a variety of effective responses to space mines which might defeat this countermeasure.

Q: When will we be ready to deploy an effective system?

A: The answer to this question will only become clear as we progress with SDI. The Fletcher Study concluded that, if a deployment decision were made, a full four-phase multitier defense system could be in place after the year 2000.

Q: Wouldn't the Soviets be able to stop deployment?

A: The U.S. would hope that, if effective defenses are achievable and can enhance deterrence, the Soviets would agree explicitly or tacitly to mutual moves toward greater reliance on defense and to refrain from attempts to threaten the other side's defenses. Moreover, a phased deployment of a moderately effective defense that could deter aggression against our offensive forces could also prevent interference with later deployments of more effective defensive systems. A major part of the rationale for pursuing the U.S. research program, however, is to ensure that we are not faced with the situation of a unilateral Soviet defense that could threaten stability and make a preemptive attack more likely.

Q: Aren't we robbing essential resources from the strategic forces modernization program to pay for SDI?

A: The SDI research program is a very small fraction of the total strategic program and most of the required funding is already in the defense program to examine SDI-related technologies. The objective of the SDI is as much to focus planned work as to augment the effort. It will not, therefore, have an adverse impact on the completion of the strategic modernization program.

Q: What would be required in the way of launch vehicles to deploy the space-based components? Do we need more Space Shuttle orbiters and what role will space stations play?

A: Until a comprehensive development program is done, the detailed space logistics requirements such as additional orbiters, space stations, or heavy-lift launch vehicles cannot be determined. However, an increase in U.S. capability in both space operations and launch vehicles is almost certainly required. One portion of the SDI program is devoted to determining space requirements and beginning design efforts on such items as a heavy-lift launch vehicle.

SDI Fiscal Qs and As

Q: How much is the SDI research and technology program going to cost to completion, and how much was the DoD going to spend on the relevant technologies before the SDI was begun?

A: The Fletcher Study recommended a program which would provide the earliest possible answers to the key technical questions. This program was designed to provide answers by 1990. The estimated cost for this program was \$26 billion in "then year" dollars. About 10% of this program would be DoE work. The Fletcher panel also developed "fiscally constrained" program plans which would slip fiscal milestones from 1990 one or two years. These alternate plans would cost \$18 billion by 1990. Final costs would be about the same as the maximum-pace program. In FY85 the DoD and DoE had planned to spend approximately \$1.75 billion on the relevant technologies. In the period 1985-1989, \$15-18 billion would have been devoted to technologies and concept development closely related to SDI. The government is therefore proposing to augment planned expenditures by 25-50% over the next five years. The pace at which the program proceeds will be set by priorities within overall national security programs. The proposed program for FY85 is only 14% above planned levels.

Q: What happens to the SDI research and technology program after 1990-1992 when it is "completed?" Does it terminate or continue to "escalate?"

A: The objective of the SDI research and technology program is to develop and demonstrate relevant technology sufficiently to permit an informed decision to commence, in the early 1990s, engineering development of a system capable of defending the U.S. and its allies against attack by nuclear-armed ballistic missiles.

Q: Certain DoD officials have implied that the final deployment costs may be "staggering." Aren't we embarking on a program which we can never afford to complete?

A: The origin of "staggering" costs statements must be taken within the context in which they were given. Compared to research and development costs, system deployments are "staggering." These statements were made in order to compare deployment costs with research and development costs. Final deployment costs of strategic defenses are not known, and indeed such estimates are a major product of the SDI research and technology system analysis projects. As with all other security measures we have taken to maintain deterrence in a dangerous world, final costs would not be inexpensive. However, most people would probably agree that a defense which is capable of decreasing the likelihood of nuclear war would be worth a great deal. Our preliminary assessment suggests that these costs will not significantly change the strategic program share of overall defense expenditures, which is currently 14%. Furthermore, at the time that deployments might begin, we expect the current strategic modernization program to be complete.

THE PRESIDENT'S STRATEGIC DEFENSE INITIATIVE--WHAT IT'S NOT

- This President is committed to providing better options and technical capabilities for future national leaders
 - To deal with a rapidly changing world nuclear status.
- Because of the technologies (and strategic policy) which must be developed
 - It is important to understand what this commitment is NOT.
- The Strategic Defense Initiative is:
 - NOT advertising simple solutions to a complex problem
 - The President fully appreciates that development of effective defense technologies is a complex and far-reaching challenge.
 - There have been, however, technical advances in the last decade that give realistic hope:
 - That extremely effective defense technologies can be more fully developed--and demonstrated--within this decade and the next.
 - That such defenses could be central to the discussion of drastic cuts in future offensive weapons.
 - That flexible defenses (capable of far-reaching effectiveness) might greatly raise the nuclear threshold.

--- The President further appreciates that commitment to the investigation of these defenses requires that the American people understand:

---- The reasons why the investigation of such defenses is now practical and necessary.

---- The costs, which can only be determined by the concerted organization and effort of our national technical resources.

---- The benefits: the technical and political returns on such an investment.

-- NOT advocating immediate deployment

--- Deployment of what?

--- The President is well aware that present-day technologies do not provide a realistic type, or degree, of necessary defense.

-- NOT advocating changes to current treaty commitments

--- The President's planned program is in complete compliance with the specific provisions in the 1972 ABM Treaty,

---- Which permits research into the modernization of ballistic missile defenses.

--- The President believes that consideration of Treaty changes should only be pursued from a position of considerably improved knowledge of our capabilities, and our strategy.

-- NOT a massively expensive crash program

--- The Defense Initiative itself is a responsibly paced investigation and development of our future national options over the next five years.

---- Its primary thrust is organization and coherent direction of a national program.

---- The proposed 5-year budget (approx. \$25B) is comparable to, or less than, those of most major tactical and strategic systems.

----- Approximately 1% of the FY85 DoD budget.

---- With present-day knowledge, there is no way to determine the ultimate cost of any of the future technology defense systems.

----- Speculation as to these costs is just that, speculation.

---- One of the most significant roles of the Defense Initiative is to determine, and reduce, costs of future defensive system options.

-- NOT abandoning present doctrines, nor our allies

--- The stability gained through our careful development of an offensive deterrence is still viable.

---- Significant changes in our deterrent posture would only be considered in light of

significant changes in demonstrated defensive and offensive capabilities and a shifting world balance.

--- Nothing in the President's present program reduces current allied investment in offensive deterrence.

-- NOT negating ongoing long-term defensive efforts to address air-breathing threats

--- The President believes the ballistic missile represents the clearest, most immediate, and most difficult threat,

---- Not the only threat.

--- The technologies developed through investigation of ballistic missile defenses can be applied both directly and indirectly to ASW and air defense,

---- Both of which have ongoing defensive efforts.